Plan Formulation for Deep Draft Harbors

Navigation Measures

Identifying Management Measures

- Structural measures
- Nonstructural measures

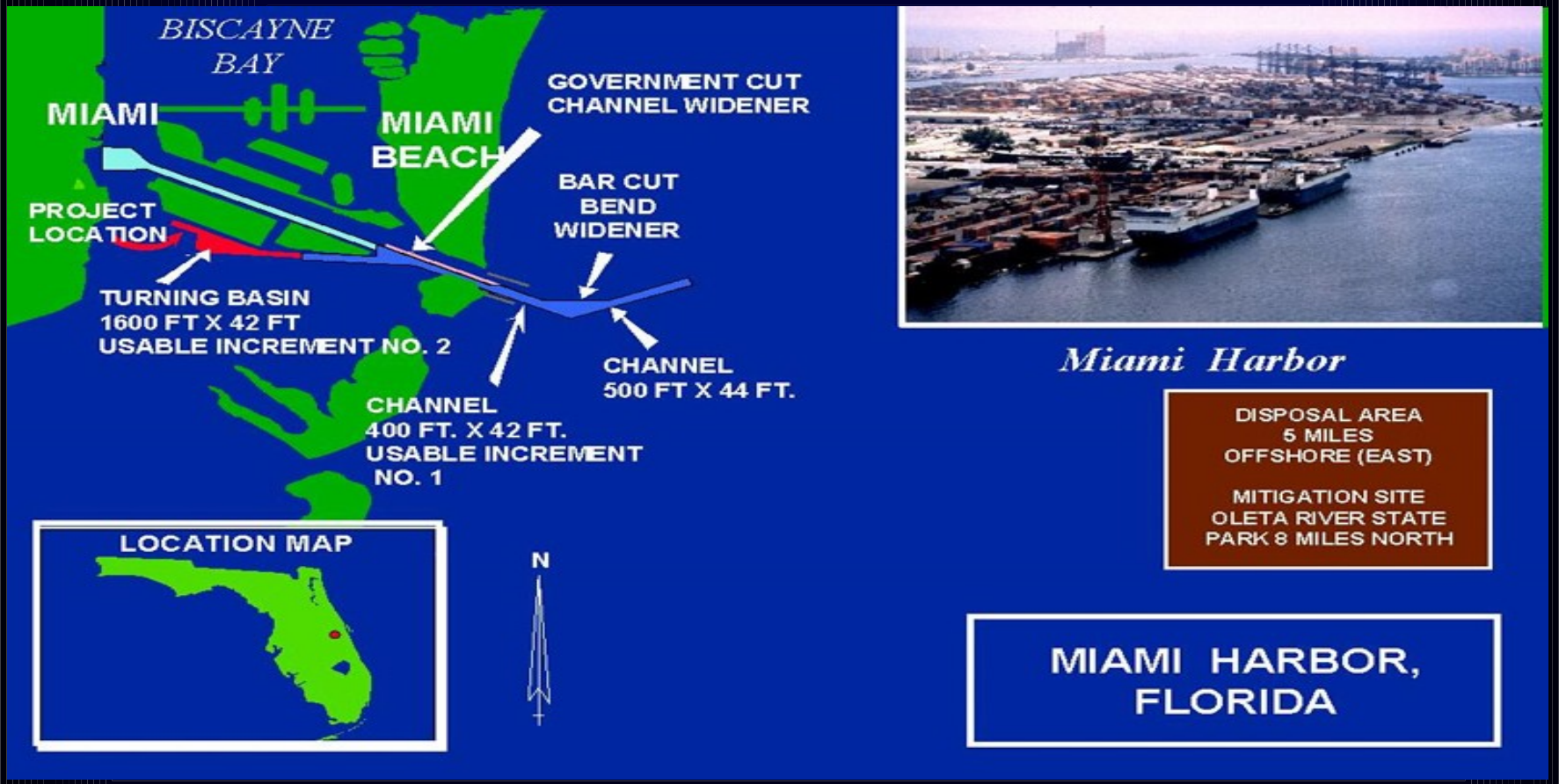
Exercise: Let’s Brainstorm a list

Structural Measures

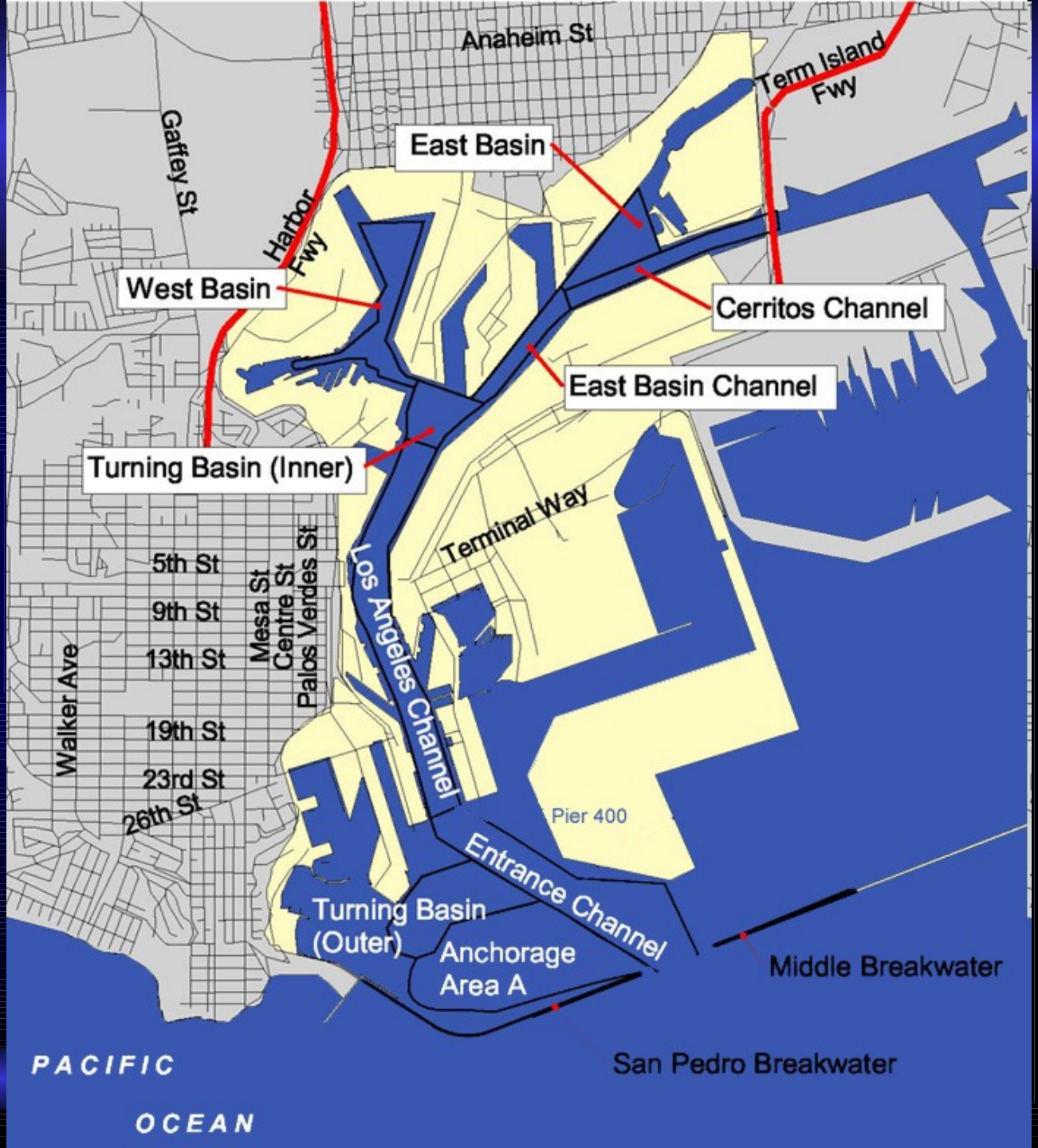
- Channel deepening and widening
- Berthing areas
- Turning basins
- Anchorages
- Breakwaters
- Jetties
- Disposal areas
- Methods e.g phased construction

Structural Measures (Harbor deepening/ widening)

Structural Measures (Turning Basins)


BISCAYNE BAY
MIAMI
MIAMI BEACH
GOVERNMENT CUT CHANNEL WIDENER
BAR CUT BEND WIDENER
PROJECT LOCATION
TURNING BASIN 1600 FT X 42 FT USABLE INCREMENT NO. 2
CHANNEL 500 FT X 44 FT.
CHANNEL 400 FT. X 42 FT. USABLE INCREMENT NO. 1
LOCATION MAP
N
Miami Harbor
DISPOSAL AREA 5 MILES OFFSHORE (EAST)
MITIGATION SITE OLETA RIVER STATE PARK 8 MILES NORTH
MIAMI HARBOR, FLORIDA

Structural Measures (Anchorages)



Structural Measures (Breakwater, confined disposal site)

Structural Measures
(Jetties)

Structural Measures
(Small boat harbor associated with deep draft)

Dredged Material Disposal

- Open Gulf/Ocean
- Confined Disposal Facilities
- Beach Disposal/Nourishment
- Beneficial Uses

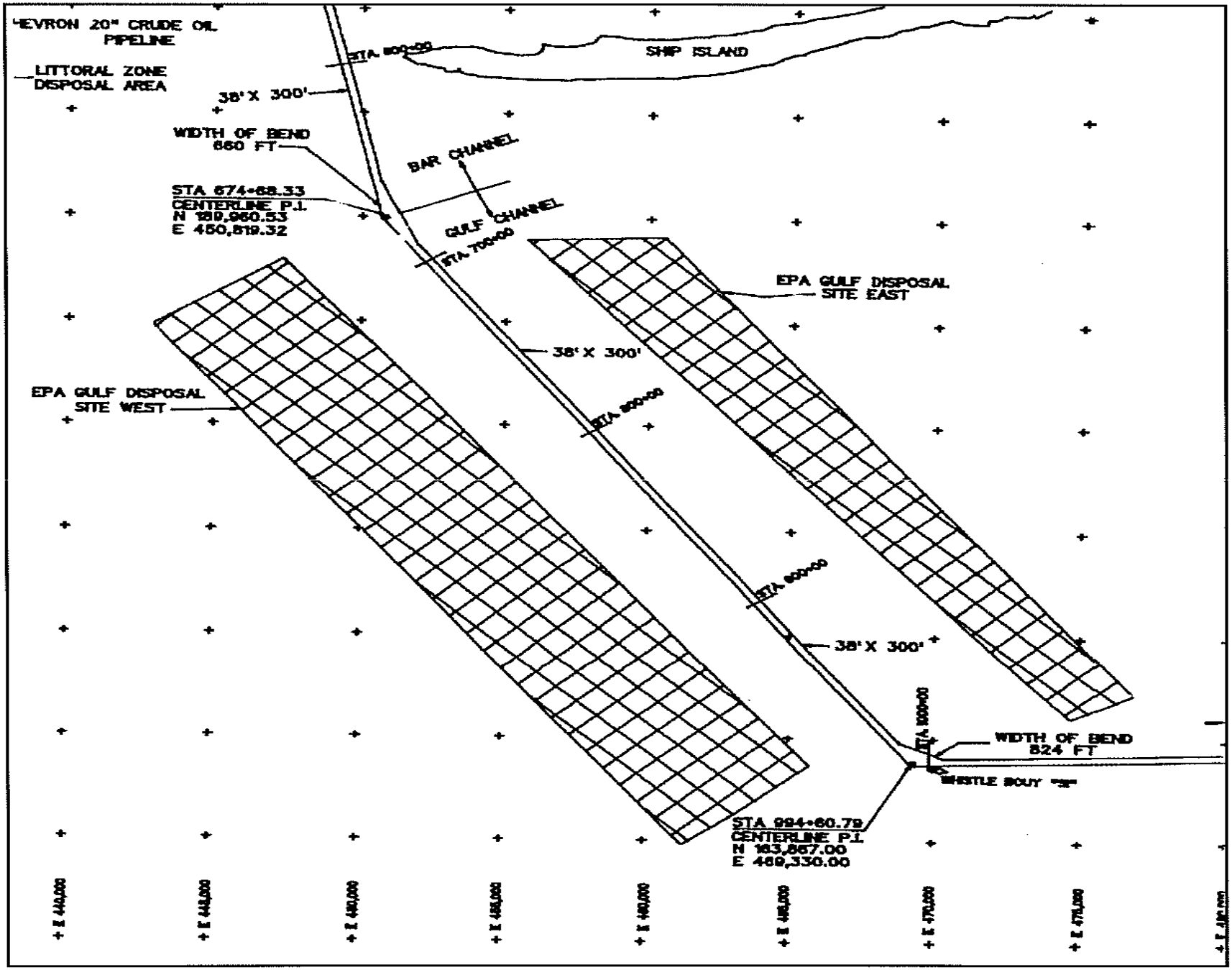
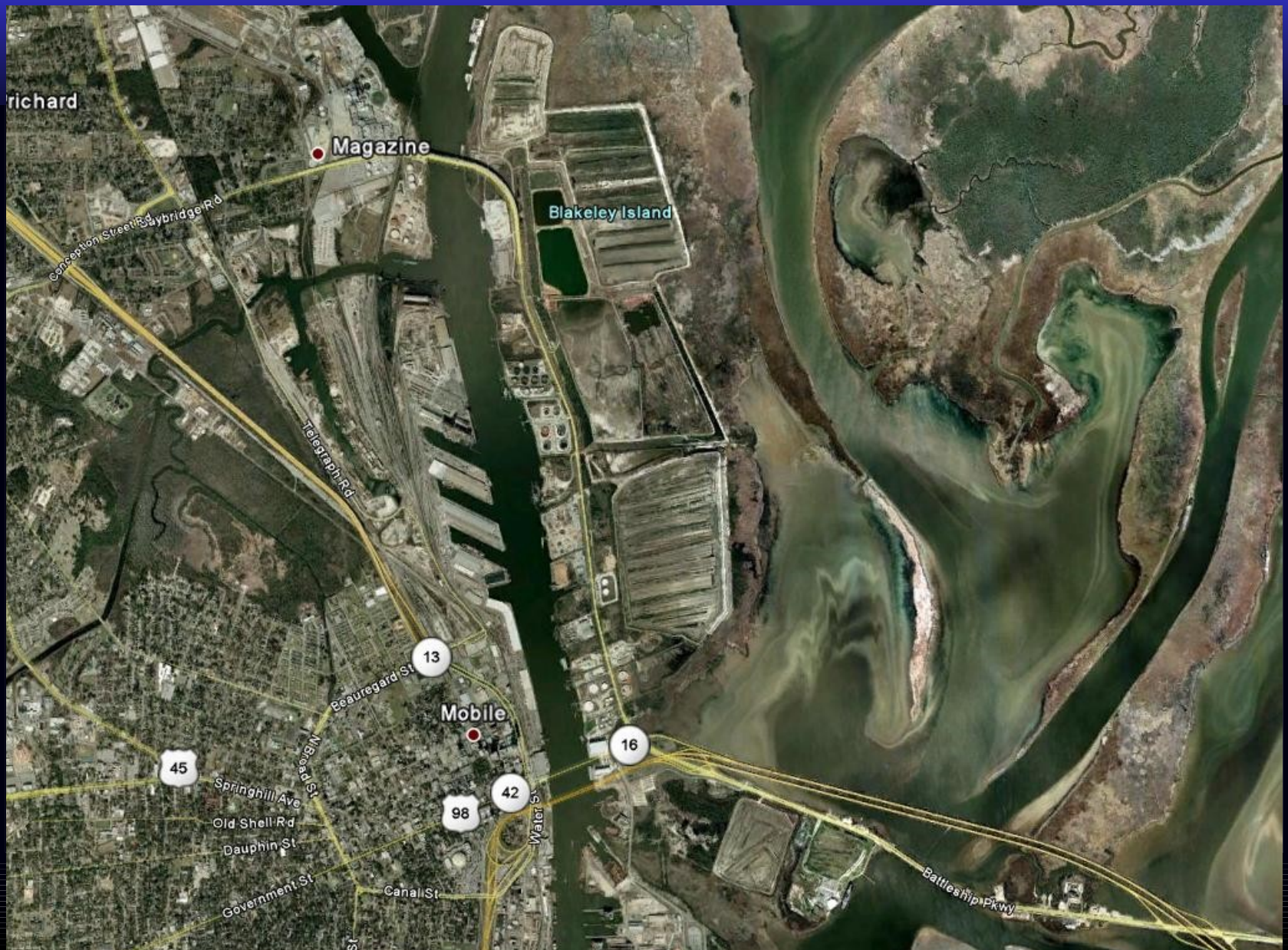
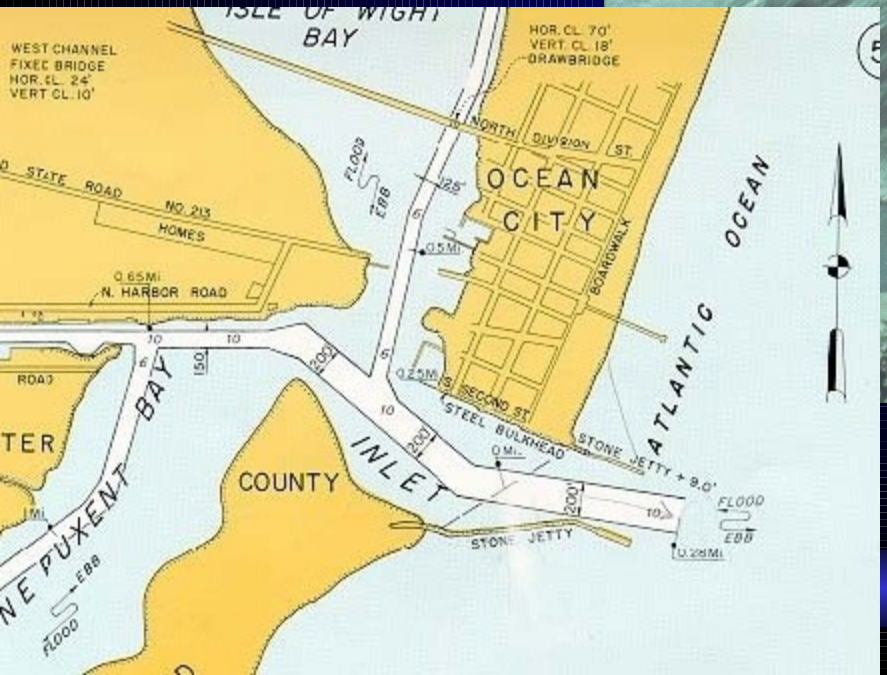


Figure 1: Gulfport ODMDSs Location Map and Operational Boundaries

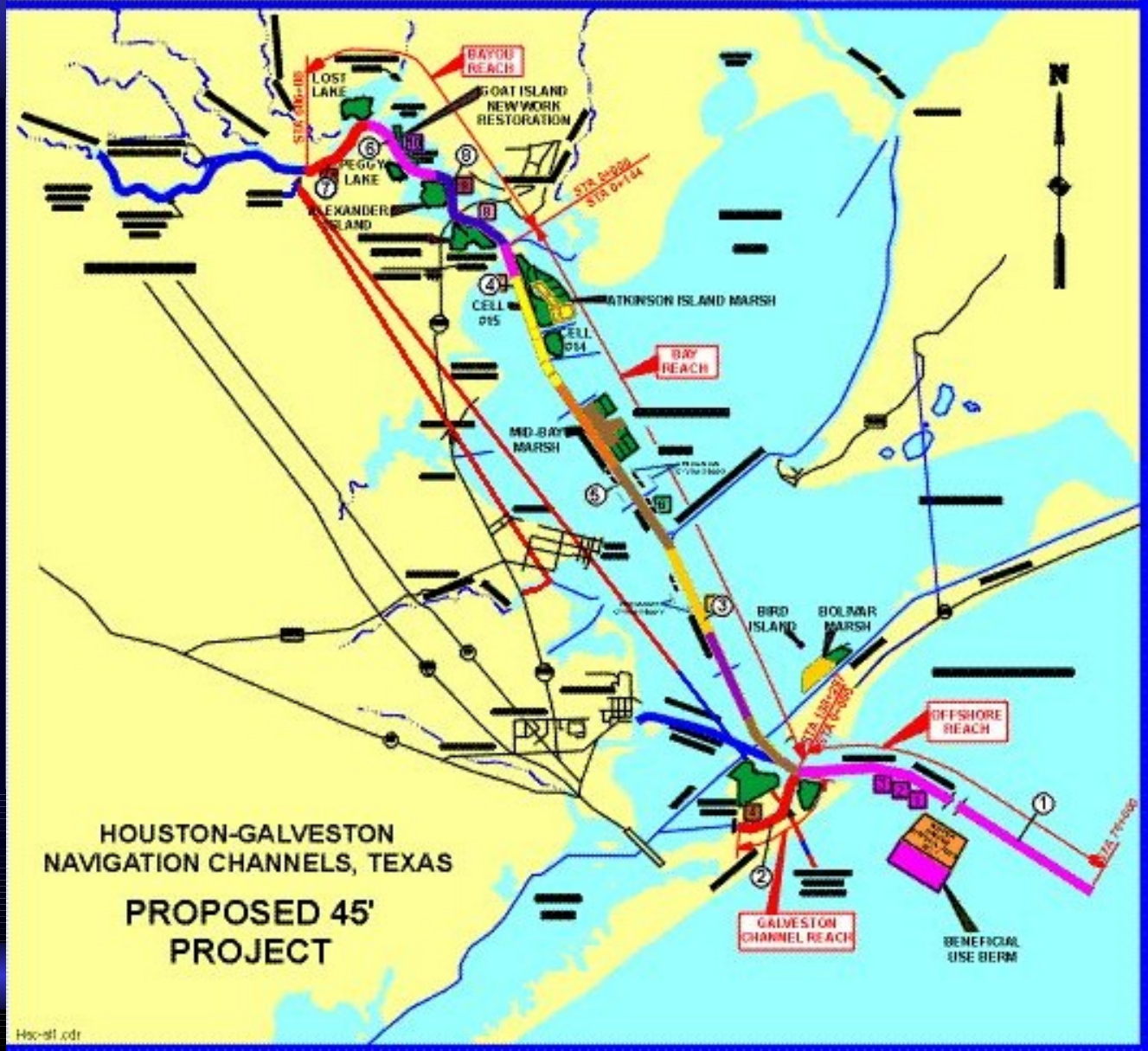
Confined Disposal Facilities



Structural Measures
(Dredging & Beach Nourishment)



HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

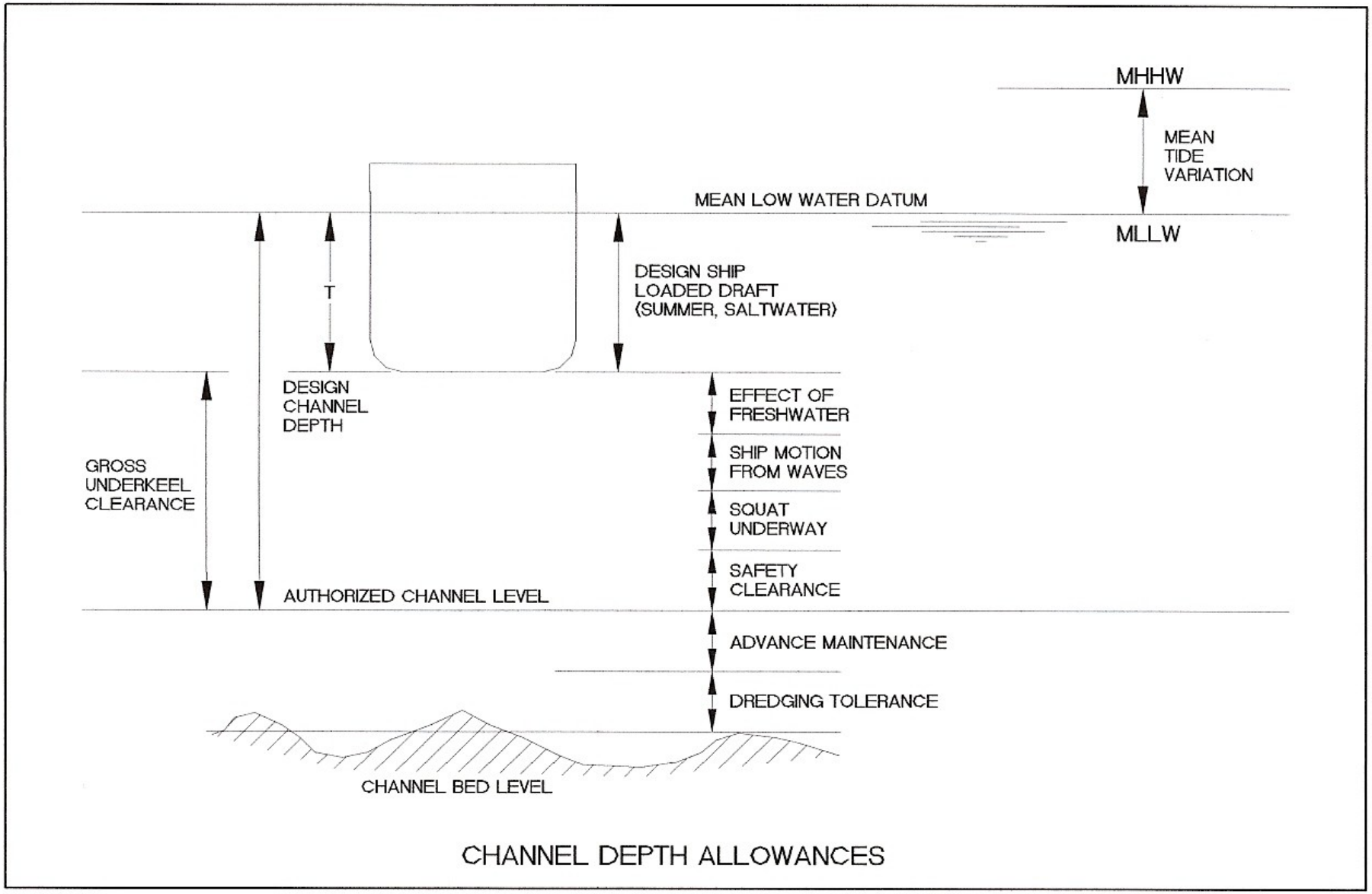


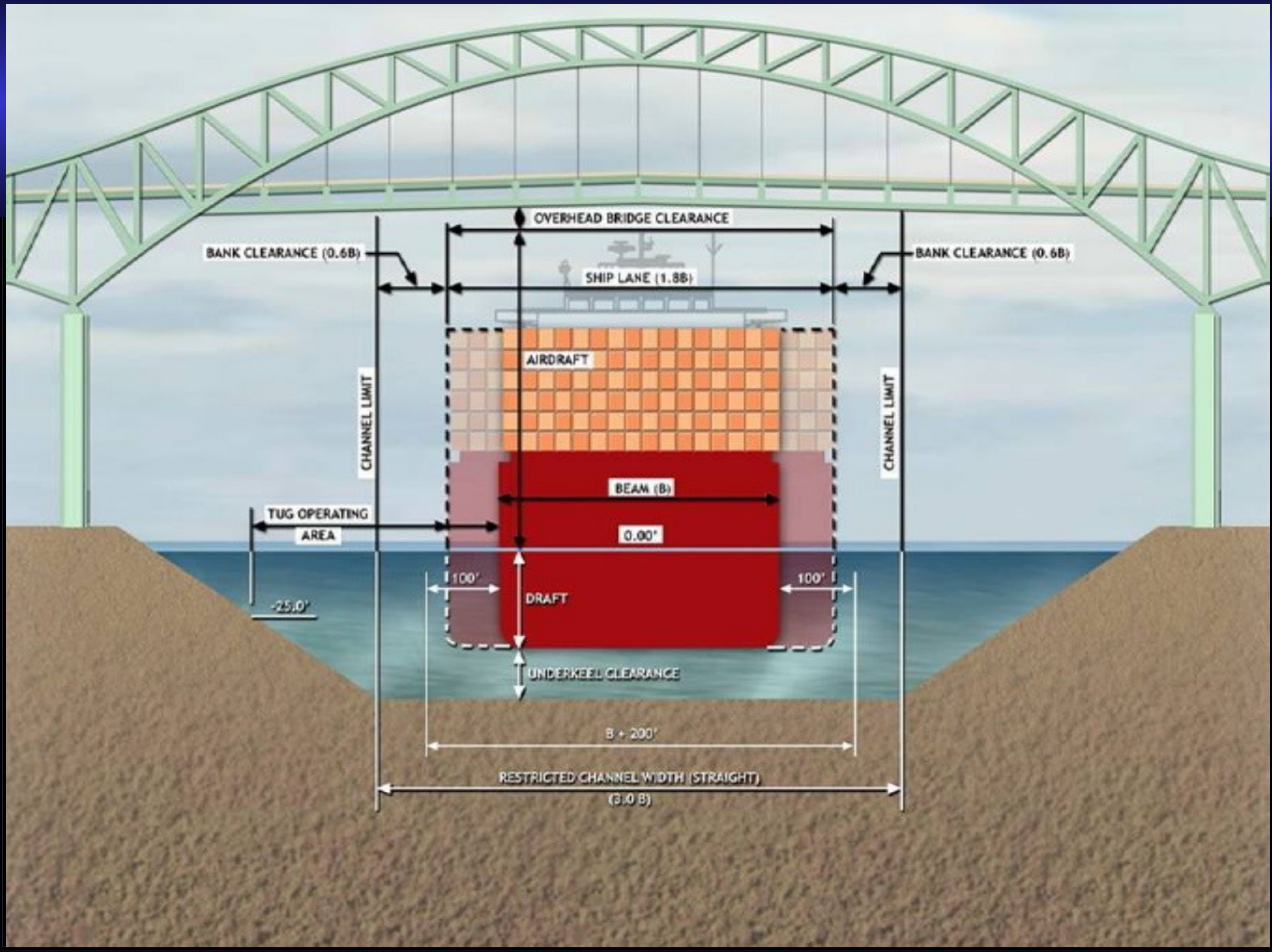
Poplar Island, MD

EM 1110-2-1613
Hydraulic Design of Deep Draft Navigation Projects

- Depth Allowances
- Channel Width
- Ship Simulator

Depth Allowances




OVERHEAD BRIDGE CLEARANCE
BANK CLEARANCE (0.6B)
BANK CLEARANCE (0.6B)
SHIP LANE (1.8B)
AIRDRAFT
CHANNEL LIMIT
CHANNEL LIMIT
BEAM (B)
TUG OPERATING AREA
0.00'
100'
100'
DRAFT
-25.0'
UNDERKEEL CLEARANCE
B + 200'
RESTRICTED CHANNEL WIDTH (STRAIGHT)
(3.0 B)

Nonstructural Measures

- Use of tide
- Light loading
- Underkeel clearance restrictions
- Lightering
- Transshipment facilities
- Pipelines
- Conveyors
- Traffic management

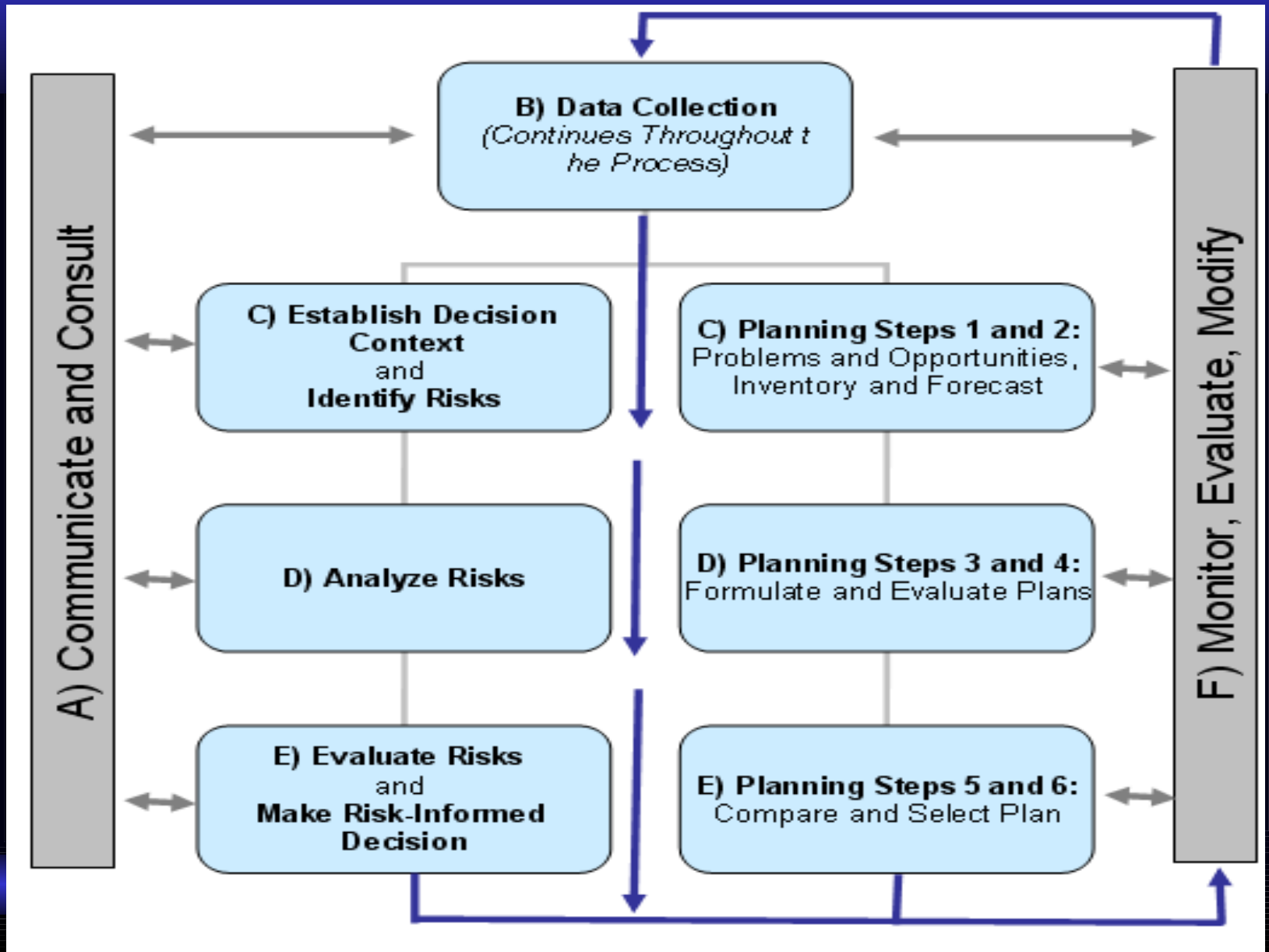
Formulate Alternatives

- Combining measures – examples
  - Channel deepening with anchorages
  - Channel deepening with phased widening
  - Traffic management with anchorages
  - Channel deepening with beneficial uses of dredged material
- Synergies – look for opportunities to serve other needs

Evaluation of Alternatives

- Forecast With Project Condition for Each Alternative Plan
  - ✓ Verify technical/engineering feasibility
  - ✓ Evaluate environmental impacts
  - ✓ Perform economic analysis of costs and benefits
- Compare Each With Project Condition to the Without Project Condition
- Characterize the Beneficial and Adverse Effects
- Compare Beneficial and Adverse Effects to Evaluation Criteria
- Account for uncertainty through sensitivity analysis

Risk-Informed Decision Making and 6-Step Planni



Specific Areas That Might Be Addressed in a Risk Analysis

- Uncertainty in commodity forecast
- Variation in fleet composition
- Sensitivity of transportation costs to fuel price fluctuations, or other factors
- Climate change impacts on sea levels (See EC 1165-2-211) such as dockside infrastructure, draft and sediment changes, and possibly demand changes
- Southeast Asia’s growing and shifting economy
- Movements towards less foreign oil dependence

NED Costs

- Construction costs
  - General Navigation Facilities
    - Project features – breakwaters, jetties, etc.
    - Dredging and disposal
    - Real estate
    - Mitigation
  - Local Service Facilities
- Operation and maintenance costs
- Interest during construction
- Associated costs

Associated Costs – What Are They and Who Pays

- Frequently overlooked because
  - Often not paid by non-Federal partner
  - Incurred by project users
- Associated with the general navigation feature to achieve the estimated benefits
- Represent costs not otherwise accounted for
  - Variable costs of doing business
  - May not be self-liquidating
  - Related to project throughput

NED Benefits – Basically Savings in Transportation Unit Costs

- Cost Reduction Benefit (same origin-destination and same mode).
  - Reductions in costs incurred from trip delays
  - Increased loads in existing ships
  - Reduction in costs because larger or longer tows
  - Reduction in costs because of using larger ships
- Change in mode benefits
- Shift of origin-destination benefits
- Induced movement benefit (if you build it, will they come?)
- Reduction in vessel damages